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**Crisis: What Crisis ?**

**Prices and Mortality in Mid-Nineteenth Century France**

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## Crisis: What Crisis ? Prices and Mortality in Mid-nineteenth Century France

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François-Marie Arouet (a.k.a. Voltaire) once quipped that if God did not exist,  
mankind would find the need to invent Him. The situation of French historiography and

economic crisis in the mid-1840s is somewhat analagous. And for two reasons. First, a long tradition in French economic demography and historiography that can be traced back to Louis Messance and Jean-Baptiste de la Mithodière in the 1760s, and from them on to Jean Meuvret, Pierre Goubert, and other giants of the post-1945 French historical school, argues that high grain prices entail excess mortality : *la mercuriale secrète la mortalité*.<sup>1</sup> And the price of wheat in France did indeed rise considerably in 1846. Second, France and much of Europe experienced civil unrest and revolution in 1848.<sup>2</sup> An economic deterministic view of revolution, long popular in France, requires an economic crisis as the proximate cause of the construction of the barricades : in Alfred de Vigny's rendition, *c'est à la boulangerie que commencent les révolutions*. So what kind of crisis did France face in 1846-7?

Our focus in this study is on the agricultural sector only. Historians agree that in the first half of the nineteenth century France escaped the terrible subsistence crises which, during the *ancien régime*, made life a precarious business for a considerable number of the very poor. In that earlier era, even though epidemics were also a threat, it is subsistence crises which were invoked as demographic regulators. Gradually, for a variety of reasons, these famines attenuated, though they could still cause mortality peaks. It was during the first half of the nineteenth century that the last of these crises occurred. In this view, the crisis of 1846 marked the final apparition of mortality of this kind.

But what is a crisis? In the absence of the kind of demographic data that become available only during the nineteenth century, historians have measured the effects of malnutrition or famine with the aid of a single measure, price: and perhaps they have relied too much on this measure. For price to offer a good picture of a crisis, there must be a strong correlation between harvests and prices on the one hand, and between harvests and

mortality crises on the other. This approach has given rise to a long but productive controversy in French historiography.

In a brilliant exercise in political arithmetic published in 1766, Louis Messance was the first to posit a statistical association between wheat prices and mortality (Messance, 1766 : 291-2, 309-30).<sup>3</sup> Messance's findings were recycled in the following century by others who posited a more systematic correlation between the two time series than he did. It is this tradition that has influenced historical demographers and, particularly, Jean Meuvret, whose name is so closely linked to subsistence crises (Meuvret, 1946), and it is within this framework that 'modernist' French historians worked at first. Pierre Goubert, according to whom, 'the economic crisis of the traditional type gave rise to a demographic crisis of the traditional type', was followed by the likes of pioneering historical demographers Louis Henry and Étienne Gautier.

A reaction was inevitable. It began with René Baehrel who pointed out in his study of the rural economy of Basse-Provence that high prices and high mortality might well coincide, but that both could be driven or influenced by a third factor, the weather. A period of bad weather responsible for a particularly bad harvest was also bound to drive up mortality. Pierre Chaunu went further, denying any causation between high prices and high mortality, and emphasising the dominant role of disease rather than hunger *tout court*. For Chaunu there was a psychological explanation for this link between prices and deaths : 'the souvenir of ration cards obsessed Jean Meuvret, who was afraid of going hungry'.<sup>4</sup> Now, Jean Meuvret did not believe that all the excess mortality he encountered was the product of subsistence crises. After all, he warned us that 'a poor harvest entails a rise in burials, but the excess deaths could be due to either hunger or epidemic diseases'. The ensuing debate ignored this point and, certainly, the anti-Meuvret critique errs in seeking to minimize the

role of poor harvests on mortality. Nonetheless, other factors, notably cholera (in the nineteenth century), plague, and dysentery have produced demographic crises that were not linked to harvest shortfalls (Chevet, 1993 : 133). And panics and rumours impacted on markets, exacerbating the effect of a poor harvest, then one may easily imagine price increases that did not always lead to a rise in deaths.

Yet it was still possible to imagine that populations were still vulnerable to subsistence crises in the early nineteenth century. Thus in their classic on world population history Marcel Reinhard and André Armengaud claimed that ‘economic crises are above all subsistence crises’, and that early nineteenth-century France ‘remains very close in the demographic sense to where it was in the second half of the eighteenth century’ (Reinhard and Armengaud, 1961: 242). Labrousse’s view of the first half of the nineteenth century was identical (Labrousse, 1976: 994).

However, André Armengaud (1976 : 202, 244) introduced a discordant note to this concert in claiming that the era of the classic subsistence crisis had ended in France in the early eighteenth century, and that subsequent crises amounted to scarcities or dearths rather than true famines. That was not to deny that in times of scarcity malnutrition could not provoke a rise in the death rates of the young, the sick, and the elderly. With the impact of food deficits thus lessened, the primary role was left to epidemics, so much so that according to G. Caudelier, in the early nineteenth century ‘the price of grain no longer had an decisive influence on morality’: the mercuriale was no longer the key to mortality.

For others, in the typology given to crises in the 1800-1870 period, that of 1847-49 is deemed ‘very serious’ and should be placed in the context of ‘the poor harvest of 1846, the economic crisis of 1847-48, and above all the new cholera epidemic’. But here too cholera seems to dominate: according to historical demographer Alain Bideau (1988 : 293), ‘it will be

noted that nearly all the mortality had an epidemic origin: subsistence crises – in particular that of 1846-49 – might be an aggravating factor’.

Against the background of the state-of-play just outlined, we propose to re-evaluate the nature of demographic crises in the first half of the nineteenth century : distinguishing those which are of purely epidemic origin and those, if they exist, which deserve to be called subsistence crises. For the reasons just cited, we will focus in particular on the crisis of 1847, which historians deem to be the only one to qualify under this rubric. That will lead us to an analysis of the impact of variations in the food supply on the price of wheat in this period.

We first analyse demographic variables – mortality, natality, nuptiality, population – with a view to identifying crises and their intensity in the 1820-1870 period (Part 11.1). We then confront the crises that stand out with price and production data. We also take account of imports as a regulator of crisis. In Part 11.2 each element in the analysis is re-focused at the level of the region or *département*. This allows us to evaluate the role that substitutes for wheat production might play.<sup>5</sup> Part 11.3 concludes.

## *11.1 – CRISES AT THE NATIONAL LEVEL*

### *11.1.A – Timing and extent in the first half of the nineteenth century.*

Deaths, like population, rose between the 1800s and the 1860s (Figure 1). The trend, however, was subject to swings and to a number of peaks representing various crises. In order to measure the amplitude of the most important crises, we have also traced a nine-year moving average in Figure 1. Our yardstick for measuring crises -- a deviation of ten per

cent or more from the average -- is not very stringent, and deliberately so. Compare Goubert, according to whom one can 'speak of a demographic crisis from the moment that the annual number of deaths doubles and when, at the same time, the number of conceptions falls in an indisputable manner, by at least one-third'. By our proposed measure, apart from the 1820s, the calendar years that stand out are 1832, 1834, 1849, 1854, 1859. The 'demographic crisis' of 1847, with a deviation of only four per cent, is not on the list. Indeed it is placed only eighth, behind two peaks of five per cent in 1826 and 1837. If we focus on the post-imperial era, as Armengaud did, it is clear that the cholera epidemics of 1832, 1834, 1849, and 1854, were far more murderous than the crisis of 1847 because in those years excess mortality levels of twelve, ten, eighteen, and seventeen per cent were registered. And, of course, the toll in 1847 pales by comparison with those associated with mortality peaks in the eighteenth century (Armengaud, 1976 ; also Bourdelais and Raulot, 1987).<sup>6</sup> In effect, quite apart from the famine of 1693 and 1694 when mortality rose by 34 and 60 per cent respectively, or that of 1709 and 1710 when the rises were 22 and 29.5 per cent, there were mortality surges of over one-fifth in 1719, 1747, and 1779 (Chevet, 1993: 130; Lachiver, 1991). Applying the measure of moving averages to the same data, crises become more numerous. Seven out of fifty-one years experience deviations of more than ten per cent in deaths, and eleven exceed five per cent. Not all of these crises were subsistence crises, of course, but the point is that when they were, their size dwarfed that of 1847. It would seem that over the long century between 1740 and 1850, there was a change, and scarcities became considerably milder or, indeed, disappeared.

As in the case of deaths, a tendency for the number of births to rise over time is apparent from Figure 1. However, the kind of 'cycle' that one sees here is much less marked and longer than those visible for deaths. One also detects in the curve a certain number of

falls in births which at first sight are linked to crises. The most severe of these, amounting to just under six per cent, was in 1847, which offers support to partisans of a subsistence crisis. The other deficits are much less serious. We note those of 1831 (-4 per cent) and 1855 (-5 per cent); the rest are lower. Moreover, none of the declines in the number of births coincides with a significant rise in the number of deaths.<sup>7</sup>

[FIGURE 1 ABOUT HERE]

In times of crisis, the drop in the birth rate has a two-fold explanation. The first, mechanical, explanation is due to the deaths of mothers-to-be. If there are such deaths, the deficit in births occurs in the same year as the rise in deaths. Alternatively, as Emmanuel Le Roy Ladurie (1973) and others have argued, privation can induce famine amenhoerrea. In that case, the decline in births would occur with a lag after the rise in deaths. The disappearance of a husband or a wife could produce a similar outcome. The available annual data make it difficult to decide between these hypotheses. Note, however, that the demographic crisis supposedly following the poor harvest of 1846, was not followed in 1848 by a significant decline in births. The same holds for the other crises occurring in this period.

On the basis of the evidence so far we would argue that nineteenth-century crises were too far removed from the conditions defined by Goubert and Meuvret to qualify as subsistence crises. To this extent we agree with those historians who claim that the vigour of crises had lessened relative to the early eighteenth century. We would go a little further, however, and argue that in the nineteenth century crises did not resemble those of the later eighteenth century either, to the extent that they had attenuated so much that they had disappeared. This is what we are about to show.



A look at the annual variation in the number of marriages yields little of interest in this context. It rose modestly from 1825 on, tapering off in the mid-1840s and accelerating slightly in the mid-1850s. There were few significant breaks. The most important, a decline of 11 per cent, was in 1847. However, this may have had more to do with the industrial crisis of 1847 than with subsistence problems. Moreover, there was no correlation across *départements* between the changes in the marriage and mortality rates. The other declines, of less than seven per cent in 1832 and less than six per cent in 1854, were associated with cholera epidemics. Moreover, a look at French population trends during the nineteenth century suggests that it grew at a more or less regular pace (Chevet and Ó Gráda, 2004a). The crisis of 1847 produced only a deceleration in population growth: hardly a surprise since there was no excess of deaths over births in that year. On the other hand, the impact of the cholera epidemic of 1859-60, when deaths exceeded births, is more visible. The population curve, which refers to a constant geographic territory, shows that the effects of the war of 1870 were much more important; only on this occasion does one witness a break in the trend.

A comparison of this curve with that of the reconstituted population of eighteenth-century France reveals essential differences, the most important being that the latter contains several breaks, the most important being those associated with famines in 1693-94 and 1709-10. Later crises, though less intense, are nevertheless visible. Thus there were breaks in 1719, 1740, 1747, and 1779. Here again, it seems to us that the first half of the nineteenth century differs from the second half of the eighteenth.

### 11.1.B – *Demographic crises, prices, and harvests.*

For the most part, historians of the *ancien régime* must do without harvest yield data; they rely on price movements as reflections of movements in output, a big rise in prices being taken to correspond to a more or less proportionate deficit in output. Though harvest data are more plentiful for the nineteenth century, it is with prices that we first confront the crises identified above. We will pay particular attention to the price of wheat. We focus on wheat because cereals – wheat, meslin, rye – account for the bulk of production in this era. In the north of France, their cultivation represented nearly ninety-five per cent of the land surface devoted to human food, with wheat accounting for two-thirds of this.<sup>8</sup> In other regions, apart from the Southwest where they accounted for only seventy per cent, cereals covered seventy-five to ninety per cent of land producing human food, with wheat's share being between sixty and seventy per cent. By contrast, the share of these cereals reached only two-fifths in the Centre and half in the South (see Figure 2). If instead of analysing the area under cereal cultivation, one turns to their share in consumption, the landscape is modified due to high potato yields. In the North the share of cereal is reduced to about seventy-one per cent, and in the Southwest to 60.6 per cent. Three other regions, West, Centre, and South, with a consumption between fifty and sixty per cent, are next, and the remaining four (Northwest, Northeast, East and Southeast) with between forty and fifty per cent. In France as a whole, cereals and maize represent about fifty-five per cent of human consumption. And, since as elsewhere these crops are the main source of urban food, one can see how it makes sense to focus on grain as an indicator of price movements. Note that, as in the case of the demographic variables, we have calculated moving averages of nine years from an annual price series based on the harvest year.<sup>9</sup>

[FIGURE 2 OF FRANCE'S AGRICULTURAL REGIONS ABOUT HERE]

Between 1820 and 1865, nine price rises of over ten per cent emerge. Among these that of almost fifty per cent in 1846 certainly stands out - see Table 1. Yet if this rise is compared to those in the years of famine towards the end of Louis XIV's reign, it is seen to be very modest. During 1693 and 1694 the price of wheat, relative to 1688-91, rose by 147 and 228 per cent, respectively. In the wake of the '*grand hiver de 1709*' there was a rise of 285 per cent (Baulant, 1968 : 539-540). These increases are out of all proportion to anything witnessed in the nineteenth century. Believers in a certain proportionality between harvest deficits and price rises must therefore concede that the crisis that followed the harvest of 1846 was on a very minor scale compared to those earlier famines.

Table I suggests that only one of the nine price rises, that of 1854, coincided with an increase in the number of deaths. Note that 1846 does not feature in the table because it produced only a very minor rise in deaths. The increase in the number of deaths of five per cent in that year does is in sharp contrast to the fifty per cent rise in the price of wheat.

We have also calculated deviations from a moving average of wheat yields. The average is an approximation, since substitutions between different food crops are likely to have taken place.<sup>10</sup> This produces deficits of over ten per cent in the 1820-64 period. In six, the deficit was in the 10-20 per cent range. In the case of three harvests (those of 1853, 1861, and 1846), it exceeded twenty per cent, the deficit of one-quarter in 1846 being the biggest. Comparing these results with those concerning mortality opens up an important result: none of the deficits encountered in yields corresponds with an increase in the number of deaths. The crises occurring between 1820 and 1865 were therefore not subsistence crises. Setting aside those of 1832, 1849 and 1854, which were due to cholera, they must be

due to epidemics that yet remain to be identified. The lack of a harvest deficit effect may arise from their mild character but, as we shall see later, it could also be due to compensating changes in other crops.<sup>11</sup>

[TABLE 1 ABOUT HERE]

Table I also shows that only five of the nine deficits (1830, 1846, 1853, 1855 and 1861) coincided with a rise in prices. Nor would there seem to be any proportionality between the rise in prices and the size of the harvest shortfalls. This suggests an initial conclusion which would seem, at least for the period considered here, to be of broader significance : price rises may be guides as indicators of deficits produced by poor harvests. This finding also suggests care insofar as the ancien regime is concerned, since some price increases could have been the products, not of poor harvests, but of political events.

#### *11.1.C – Substitutes and Imports.*

We have seen that wheat, meslin, and rye were not the only items destined for human consumption. Depending on the region, they were supplemented by buckwheat, maize, and the potato. It is unlikely that all these crops were affected in the same way, with the result that some compensations between crops are likely to have occurred. Moreover, since these three crops were sown in April or May, or even June in the case of buckwheat, it was also possible that if the weather compromised the wheat and rye harvests, the area under these other crops was extended as a precautionary measure.

In 1846 the volume of the wheat harvest fell by 19 per cent relative to the 1842-45 average, while those of meslin and rye fell by 25.3 and 29 per cent, respectively. The total cereal deficit came to 22 per cent, or a little less than indicated by the shortfall in yields. Against this, the buckwheat harvest rose by 29 per cent and the maize harvest by 26.5 per cent. The rise in these two items would have been sufficient to match the deficit in wheat and rye, were it not that the potato harvest was also a poor one. In aggregate the deficit in crops destined for human food was about 17.5 per cent, so that in this particular case, the wheat yield was a good indicator of the variation in output. However, the fact that the importance of buckwheat and maize across the country varied considerably suggests the need for a geographic analysis of regional disparities in harvest shortfalls. It also bears noting that in 1846 the area under buckwheat rose by 4.4 percent relative to 1842-45, that under maize by 9.6 per cent, and that under potatoes by zero. It would seem therefore that farmers, in confronting the crisis that was unfolding, increased, where possible, the area under these crops. We need to see whether these rises occurred in those regions where the grain harvest deficits were greatest.<sup>12</sup>

Apart from these substitutes, economies at the beginning of the nineteenth century had another means of counteracting deficits: imports. Did they exploit it during the 1846 harvest year? That is what we are about to see. In 1846 France imported 4,910 million hl of wheat, either as grain or converted into flour. In 1847 she imported 10,100 million hl and in 1848, 1,250 million hl. The administrative practice of producing import statistics for the calendar year force us to make a few assumptions, in order to evaluate the impact of imports on the 1846 harvest year. Since the 1845 harvest was an average one, we may assume that imports in 1846 are more likely to have been concentrated towards the end of the year, in other words, during the 1846 harvest year. As for imports in 1847, given a surplus harvest

that year, the demand for foreign wheat is likely to have fallen, as was surely the case in 1848, another good year. The bulk of imports in 1847 are therefore likely to have been in response to the situation in 1846. So as not to stack the cards in favour of the case we are making, we will claim only the 10,100 millions hl of wheat imported during 1846 for the 1846/7 harvest year. Even that reduces the wheat deficit from 14,150 million hl to 4,150 million hl, or only 5.5 per cent of wheat consumption. If these imports are included in the overall balance reached above, a deficit of 17.3 per cent is reduced to one of 13.4 per cent. This implies that there was no mortality crisis due to a lack of food in 1846. True, for imports to have had the impact described, they would have had to be present during the harvest year, and particularly during the second half of the year. As things stand, we cannot be certain about this, but the downward trend in prices from May 1847 on makes it more likely.

### *11.2 – WAS THE CRISIS OF 1846/7 A REGIONAL CRISIS?*

Perhaps we should have ended this paper here on the basis that the mythical status of the crisis of 1846 would seem to be well established by now. We continue the analysis, however, since it is quite likely that marked regional disparities mask through cancelling out the existence of regional crises. For this reason, we move the analysis from the national to the regional and départemental level in search of possible regional crises. The strategy adopted is the same. Still, at the end of the day, the analysis of the substitute crops, buckwheat, maize, and potatoes will be more precise, since the importance of these crops varied considerably across France. To begin, we look at the extent of any mortality crises at *département* level.

### 11.2.A – *Were there regional demographic crises in 1846/7?*

In seeking to identify crises, we proceed as before. The series at our disposal are long enough to generate deviations from seven-year moving averages for every *département*. An examination of the results reveals a certain number of *départements* with a rise in mortality in 1846; another group where the phenomenon is visible only in 1847; and a third where increases in mortality were insignificant. The outcome is summarised in Maps I and II below.

Had we information on mortality trends during the 1846/7 harvest year, the results might have been different, particularly if the mortality in *départements* that stand out in the 1846 map was restricted mainly to the second half of the calendar year. To that extent, we may have underestimated the size of the 1847 crisis. However, lacking the number of deaths during the harvest year has one advantage. In effect, if we were dealing with a genuine subsistence crisis, the worst of the mortality would have been produced at the end of the harvest year, in other words in the first half of 1847 and not in the second half of 1846. That suggests two remarks. The first is that the spread of deaths argues in favour of deaths from infectious diseases than from the lack of food *tout court*. The second is more general, and consists of a caution against reasoning based on annual data, be they harvest or calendar years, without knowing their monthly breakdowns.

[MAPS I-IV ABOUT HERE]

In 1846 twenty-eight *départements* out of eighty-six experienced an excess mortality of over ten per cent, and in ten of these it exceeded fifteen percent. The change in geographic scale thus offers another perspective on excess mortality, though this still remains very modest. The identification of the *départements* worst affected reveals an arbitrary distribution spread across France. It lacks any geographic coherence. The fifteen percent toll in Hautes-Alpes is isolated. And although Aisne and, to a lesser extent Aube, Oise and Marne, were hit, the Paris provisioning region remained untouched, an outcome far from characterising a real subsistence crisis. The Southwest was unevenly affected. Only the Centre seems to have been comprehensively hit. All in all, these excess mortalities, modest compared to those of the previous century, seem to have been of a local character. Perhaps they were epidemiological in origin, since a subsistence crisis would have affected a bigger region - one supplying the major cities, for example, or one sharing the same climatic or production mix characteristics. In addition, bearing in mind that there was no cereal deficit in that year, the case seems closed.

In 1847, forty *départements* had an excess mortality of over ten per cent (Map II), and in twenty the excess was over fifteen per cent. As in 1846, the change in geographic scale is telling. However, the increases in mortality were more or less the same in both years. This suggests some remarks. We have just seen that in 1846 some *départements* might register excess mortality above ten per cent, while at national level no crisis is visible. This finding can be extended to other years in this period, and even generalised. In 1839, for instance, a year in which mortality was a little below trend, no fewer than eleven *départements* suffered an excess mortality of ten per cent or more, and in Seine-Inférieure a level of twenty-nine per cent was reached. 1842 offers another example, when seven *départements* exceeded ten per cent. In these two years epidemics are the likely culprits for such local crises. A comparison



between these two years, to which one might add 1846 and 1847, shows that a disparity in the number of *départements* touched by this excess mortality is the only difference between them, so much so that one may imagine that the excess mortality in these *départements* stems from local epidemics.

In 1847, as in 1846, the geographic spread of mortality by *département* lacks any of the spatial coherence expected from a subsistence crisis. It would be pointless to give a detailed description of this spread: enough to add that the affected *départements*, the Centre region apart, are spread throughout the whole of France. Which leads to the conclusion that in 1847 too the likely cause of the crisis was local epidemics, at best remotely linked to problems of subsistence. A comparative look at local output conditions adds further insight.

#### *11.2.B – Demographic crises, price rises and harvest deficits at the regional level in 1847.*

If the supposed increase in deaths in 1847 resulted from insufficient food, the map that would show this ought to bear some resemblance to that of the rise in price. In order to verify this, we have calculated for harvest year 1846/7 the rise in price in each *département*, using a five-year moving average of the price of wheat. Map III indicates the rise in prices was very significant. It was not uniform across the country, being greatest in the Northeast and least in the Southwest.

It is very difficult to establish a benchmark for a subsistence crisis, or even the existence of a crisis, on the basis of prices alone. Nevertheless, a close examination of the variations in price shows that rises of the order of twenty-five to thirty per cent were not unusual during the first half of this century, and that such rises were not associated with

subsistence crises. That was even sometimes the case when the price rise was greater. We would therefore maintain, somewhat arbitrarily, it is true, that in cases where the price rise of wheat was less than fifty per cent, the existence of a crisis was dubious at the least. In this case, if wheat prices are used a guide, the crisis held sway north of an imaginary Saint-Malo-Geneva line, though omitting Brittany and part of Normandy.

Yet comparing this map with that describing mortality, discussed above, suggests that there was no association between the two phenomena. The mortality crisis therefore would seem to bear little relation with subsistence crises or with the peaks noted in the price series. Thus if some *départements* in the Northeast and Centre affected by excess mortality experienced a significant rise in prices, others in the same zones did not. To be sure, one might claim that there was a subsistence crisis in the Northeast and the epidemics were at work where no increase in the price of wheat is observed. But this latter argument does not hold water since many *départements* saw prices rise without experiencing a mortality crisis.

Figure 3 shows price increases on the x-axis and changes in the death rate on the y-axis. The horizontal cloud of dots indicates that there is no relation between the two variables. For those in doubt, the correlation coefficient of 0.05 between the two confirms the conclusions drawn from comparing maps and from the graph.<sup>13</sup>

[FIGURE 3 ABOUT HERE]

Next, we examine the relation between the rise in deaths and variations in output across *départements*, using the variation in the wheat yield as an index of output. We estimated this measure of the harvest deficit in each *département* relative to the average for 1843-45. Map IV makes plain that the shortfall in grain yields was unevenly distributed

across the country. There were considerable deficits in the northeast, along the Mediterranean coast and the Rhône corridor, along the Atlantic coast and in the north of Brittany. Elsewhere the declines were modest. Comparing Map 1 with that describing excess deaths in 1847 (Map 2) suggests that both phenomena were relatively independent of each other. In the Northeast only a few *départements* with a sizeable harvest deficit show excess mortality. Nor does one find in the south a close correspondence between the two phenomena. As for the most *départements* in central France which saw increased mortality, they were not subject to food crises. In Figure 4 the deficit in wheat yield in each *département* is plotted against the rise in deaths. Most of the resultant dots form a circle, indicating that the two variables are independent of each other.

[FIGURE 4 ABOUT HERE]

Clearly the map describing harvest deficits as defined above does not square easily with that describing the rise in prices (Maps 3 and 4). The correlation between price rises and harvest shortfalls is weak, and on that basis one would be hard put to argue that the price rises were due to harvest shortfalls (Chevet and Ó Gráda, 2004a: 184-6). When we focus instead on the quantities sold on grain markets (i.e. apart from what is sold locally or consumed on the farm), however, and calculate the 1846 deficit relative to sales in 1844-45, the outcome is as described in Figure 5. While the aggregate change in market sales was minimal, there was considerable variation across *départements*. As expected, the link between price and 'supply' is now stronger: the correlation between changes in quantities marketed (which include imports) and price is  $-0.55$ .<sup>14</sup>

[FIGURE 5 ABOUT HERE]

*11.2.C – Did substitutes play a bigger role at the regional level?*

Given the substitutability between crops and the likelihood that harvests are less than perfectly correlated, an approximate measure of the aggregate crop deficit is desirable. For this purpose, we rely on the nine-zone division used by the Ministry of Agriculture<sup>15</sup> (see Table II). We first calculated the mean harvest for wheat, meslin, rye, buckwheat, maize, and potatoes in 1842-45 for all zones, and then calculated the 1846 deficit as a percentage. For aggregation purposes we converted harvests expressed in hectolitres into quintals. Inevitably, this adds another element of approximation. The results of these calculations are given in Table 2.

[TABLE 2 ABOUT HERE]

First of all, Table II confirms that the deficit in the wheat harvest affected the whole country, apart from the Southwest. It was greatest in the North and East, and was by no means compensated by a rise in the output of meslin or rye. On the contrary, these two cereals registered even greater declines than wheat. At national level, taking all three cereals into account increases the deficit from 18.9 to 22 per cent. The outputs of other crops reinforce considerably the inequality in deficits. Buckwheat, though unimportant at national level, accounted for more than a quarter of output in the Northwest. Significantly, outside the North and Northeast the production of buckwheat rose in 1846, sometimes by a huge factor relative to the reference years. The same holds for other regions in the case of maize. Its production also increased in practically all regions. In the Southwest in particular, that

helped compensate for the deficit in wheat, meslin, and rye, since maize accounted for about twenty-three per cent of production and its production rose by nearly one-fifth.

The role of the potato is more varied. In the East, a huge shortfall in output in 1846 relative to 1842-45 increased the overall food deficit from 24.4 per cent to 29.5 per cent. By contrast, in the Centre the potato helped greatly to compensate for the deficit in cereals. There, although the cereal shortfall amounted just over one-quarter, thanks to the potato the overall harvest was above normal. However, unlike buckwheat and maize, the potato did not help to reduce the overall food deficit – except in the Central and South regions. On the contrary it amplified it.<sup>16</sup>

Overall, four regions with losses of ten per cent or less -- the Centre, Southwest, South and Southeast -- seem to have escaped the 'crisis'. The North with a loss of 15.6 per cent occupied an intermediate position, whereas the other four regions saw aggregate output fall by between 22.5 and 29.5 per cent. Comparing the results in Table 2 to those in Map II, it is clear that *départements* experiencing an increase in mortality were mostly located in those regions where the production deficit was smallest. Only two of the eleven *départements* with a rise in deaths of over one-fifth were located in a zone with a deficit exceeding one-fifth. Another significant fact is that only two *départements* in the zone with the biggest deficit, the East, saw a rise in mortality, and a very weak one at that (for more detail see Chevet and Ó Gráda, 2004a). In sum, the increase in the number of deaths cannot have been due to a subsistence crisis.

### 11.3. CONCLUSION

This study suggests during in the mid- and late 1840s harvest deficits were not severe enough to have resulted in a genuine subsistence crisis. While it is true that price rises were a fair guide to variations in the amount of wheat bought and sold on grain markets across the country, deficits in the wheat harvest, where they occurred, were uncorrelated with rises in mortality. Nor should the focus be so exclusively on the wheat harvest : buckwheat, maize and the potato, as well as imports, could – and did in places – compensate for a deficit in wheat. Moreover, because the potato was less affected by *phytophthora infestans*, it did not play the catastrophic role in France that it played in Ireland and Belgian Flanders (Solar, 1997). The total area under potatoes in France in 1845 was the same as in Ireland (about one million hectares), and yields in France were considerably lower. As in Ireland the 1845 harvest was poor, but the shortfall in 1846 (as described above) was minor relative to the virtual destruction of the crop in Ireland. Besides, in France potato output in 1847 was back to its pre-1845 ‘norm’, whereas in Ireland it was only a fraction of the tonnage achieved in the early 1840s.<sup>17</sup> This explains why the rise in prices was less and not as long-lasting in France. True, in some *départements* the increases in the price of potatoes at the peak in May 1847 were enormous, but on average they reached only 130 per cent above their pre-crisis level, to which they fell back thereafter. By way of comparison, the price of potatoes in Dublin, the Irish capital, reached four times the pre-famine average in late 1846 and again in the early summer of 1848. The rise in Belfast and elsewhere in the country was commensurate.<sup>18</sup>

All these changes mean that in France the first half of the nineteenth century marked a diametric break, as others have already noted, with earlier centuries and even with the second half of the eighteenth century. Why, then, has 1846 become a crisis year, when deaths in that year exceeded the moving average by only a few per cent and were dwarfed by

the mortality peak due to the cholera epidemic of 1849? And why are the harvest shortfalls of 1853 and 1855, comparable in extent to 1846, largely ignored in the literature? Surely, in part, because the Revolution of 1848 required an economic basis: a long historiographical tradition links it with the economic distress of the previous two years, not least the poor harvest of 1846 (e.g. Labrousse, 1956 ; Tilly and Lees, 1975 ; Price, 1996 : 11-12). Surely too because contemporaries saw a food availability crisis in the undeniable rise in prices, a crisis which they linked too hastily with an excess mortality that was taken for granted. Armed with this conviction, why bother scrutinising a mortality curve when a graph showing prices is its spitting image, and when a price graph offers a photographic negative of output?

One caveat before concluding. This attempt at revising our understanding of the 1846-48 period does not seek to deny that high prices on occasion resulted in genuine hardship. On the contrary: and, to make matters worse, in France the rise in grain prices in 1846 was followed by a fall in industrial output in 1847, which led to further hardship in 1848 (Chevalier, 1978 ; Tilly and Lees, 1975 ; Vivier, 2005). If 'crisis' means privation, unemployment, panic, and disorder, then there is no denying that the 1846-48 period represented such a crisis. Indeed, it is over a century since demographer Émile Levasseur pointed out the correlation between years of high food prices and peaks in criminality in nineteenth-century France, and the unrest in France in these years is well documented in Nadine Vivier's contribution to this volume (Levasseur, as cited by Sorokin, 1975 : 228).

The link between resistance and famine is not a straightforward one. Individual violent acts, borne of desperation or shifting entitlements, should be distinguished from concerted action involving large groups of people. Food riots – as distinct from individual acts of thieving and cheating – are more likely to be the product of 'minor hunger and deprivation' rather than 'real starvation'. This was certainly the case in Ireland in the 1840s,

where collaborative action in the early stages gave way to despair as the crisis became a catastrophe (compare Eiríksson, 1997). With reference to France in 1846/7 and 1847/8, the correspondence between popular unrest, on the one hand, and price rises and harvest deficits, on the other, was poor. Again, if we define 'crisis' by panic and unrest, France indeed went through a crisis; but our analyses of agricultural output and demographic data, and of the impact of substitute crops and imports on food availability, suggest that the reduction in food supplies in this period did produce a 'crisis' in the historiographical – 'subsistence crisis' – sense of that term. As other chapters in this work show, in some other places in Europe it was a different matter.<sup>19</sup>

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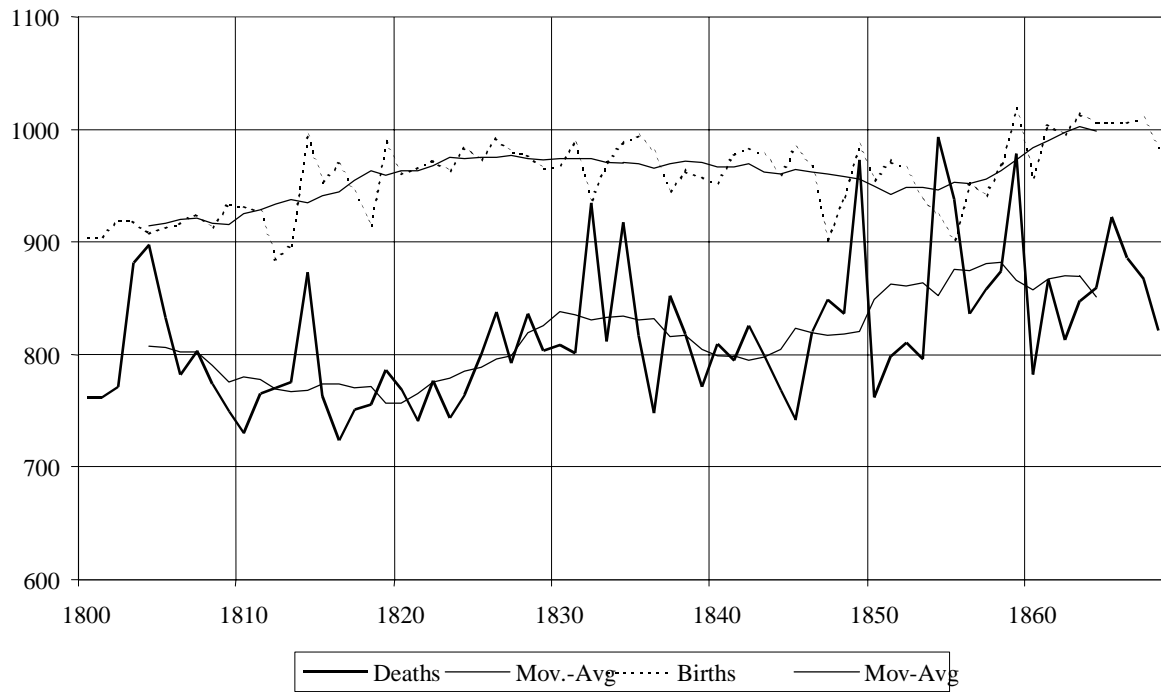
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Figure 1: The Movement in the Number of Births and Deaths



[FIGURE 2 (AGRICULTURAL REGIONS) TO COME]

Figure 3: The Influence of Price Change on Deaths

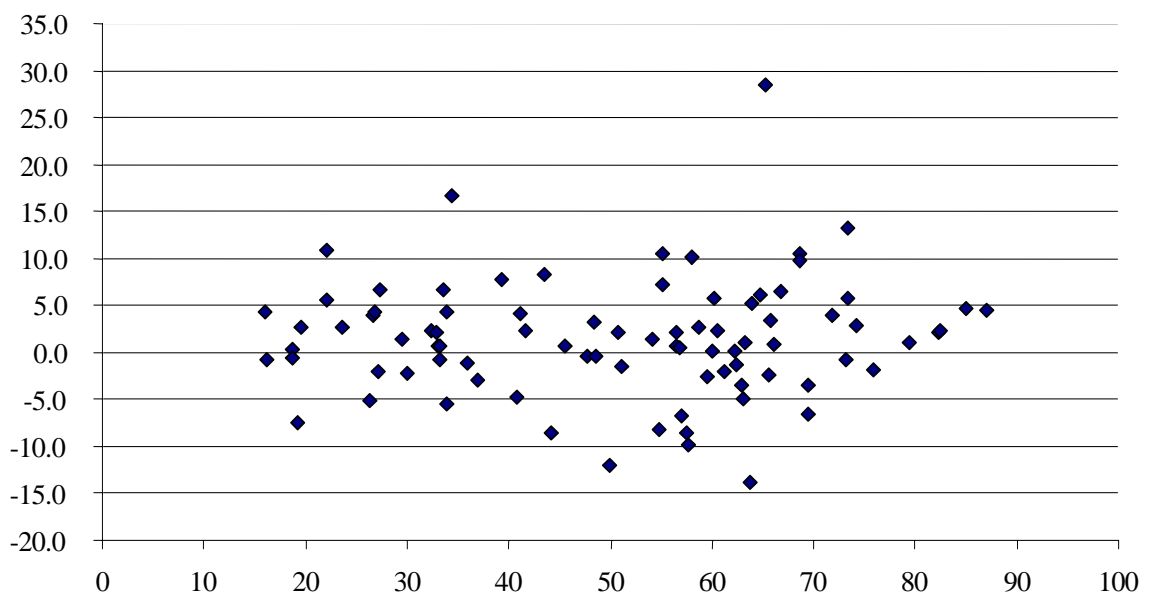


Figure 4: The Influence of Yield Variation on Mortality (%).

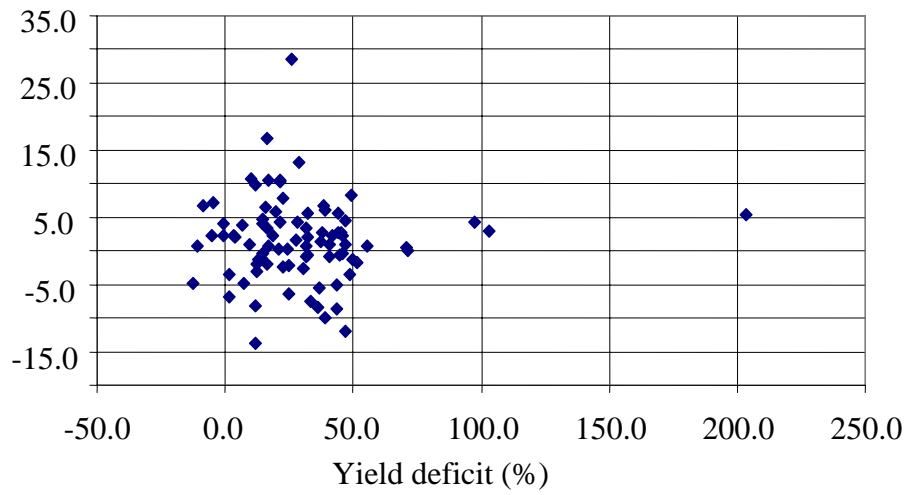


Figure 5. Changes in Grain Sold and Price in 1846

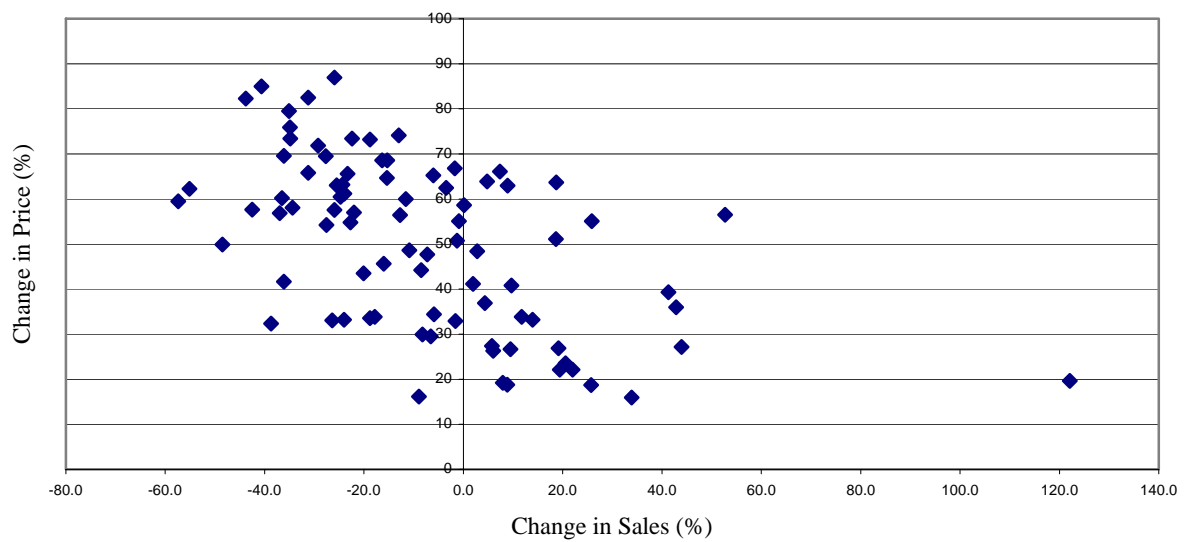


TABLE 1. YEARS OF DEMOGRAPHIC CRISIS, 'SUBSISTENCE CRISES', AND HIGH PRICES

<i>Year</i>	<i>Production deficit</i>	<i>Price increase</i>	<i>Increase in deaths</i>
1820	12.5	Nil	Nil
1828	Nil	11.2	Nil
1830	15.5	Nil	Nil
1831	10.4	13.5	Nil
1832	Nil	Nil	12
1834	Nil	Nil	10
1839	Nil	16	Nil
1846	25.1	49.9	Nil
1849	Nil	Nil	18
1853	22.4	22.8	Nil
1854	Nil	11.7	17
1855	17	27.5	Nil
1856	Nil	21.2	Nil
1859	Nil	Nil	13
1861	23.2	25.3	Nil
1863	16.3	Nil	Nil
1864	16	Nil	Nil

TABLE 2. HARVEST DEFICITS OF DIFFERENT CROPS DESTINED FOR HUMAN CONSUMPTION (PERCENTAGES BY REGION) IN 1846

	<i>Wheat</i>	<i>Meslin</i>	<i>Rye</i>	<i>All Cereals</i>	<i>Buckwheat</i>	<i>Maize</i>	<i>Potatoes</i>	<i>Total</i>
Northwest	- 19.9	- 30.5	- 37.6	- 25.7	32.7	64.5	- 53.0	- 26.2
North	- 16.3	- 19.7	- 36.6	- 19.2	- 21.8	- 8.1	- 6.9	- 15.6
Northeast	- 23.5	- 26.6	- 32.5	- 25.5	- 12.8	5.9	- 20.4	- 22.4
West	- 20.0	- 25.8	- 37.8	- 25.1	28.5	15.2	- 28.9	- 24.1
Centre	- 16.1	- 22.3	- 37.2	- 25.6	- 1.5	- 21.6	42.2	3.3
East	- 22.4	- 36.0	- 24.1	- 24.4	31.8	35.9	- 42.0	- 29.5
Southwest	- 5.2	-16.8	- 31.8	- 11.5	64.8	19.7	- 26.6	- 6.3
South	- 24.9	- 20.5	- 23.1	- 23.9	19.2	47.0	10.4	- 4.0
Southeast	- 26.2	- 50.2	27.8	- 12.7	12.6	5.8	- 6.8	- 10.3
Total	- 18.9	- 25.3	- 29.0	- 22.1	29.2	26.5	- 18.9	- 17.4

## ENDNOTES

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<sup>1</sup> The quote is due to G. Livet. It is cited in Cabourdin 1988, who offers an excellent survey of the literature.

<sup>2</sup> For a panoramic overview of the revolutions of the 1840s see Dowe *et al.* 2001.

<sup>3</sup> Or, as seems more likely, his patron Jean-Baptiste François de la Michodière. See Chevet and Ó Gráda 2004b.

<sup>4</sup> See Cabourdin 1988: 178-180; Chaunu 1991.

<sup>5</sup> The results described here are set out in greater detail in Chevet and Ó Gráda 2004a.

<sup>6</sup> One might object that working with harvest years minimises the gravity of the crisis of 1847. That might be the case if one found a rise in deaths in 1846. That not being the case, taking account of the last six months of 1846 cannot augment the crisis of 1847.

<sup>7</sup> Note that while it makes sense to think of harvest-induced crises in terms of harvest years, demographic data invariably (as here) refer to calendar years.

<sup>8</sup> Our calculation does not take account of oats and barley because they were produced almost exclusively for livestock consumption.

<sup>9</sup> The prices used are those published in Labrousse 1970.

<sup>10</sup> The data on yields, area under cultivation, and production used in this paper come from Ministère de l'agriculture et du commerce 1878.

<sup>11</sup> The years of scarcity have been identified from a annual average price series calculated from all *départements* between 1833 and 1860. Before and after these two dates, the average national price was based on only one third of *départements*, which would seem to bias downwards a little the percentage rise in prices.

<sup>12</sup> In certain *départements*, barley and oats still accounted for a share, albeit small, of human diet in the mid-nineteenth century. It is quite likely that their share rose during scarcities.

<sup>13</sup> Nor was there any correlation across *départements* between the marriage rate and the death rate in 1847.

<sup>14</sup> One must not ignore, however, the quantities of other grain crops sold on the market.

<sup>15</sup> In the text the zones are henceforth denoted by a capital letter, e.g. East, Centre.

<sup>16</sup> In half a dozen *départements* in the west of France (the three Breton *départements* plus Ile-et-Vilaine, the Vendée, and Loire-Atlantique) the decline in the cultivated area under potatoes exceeded thirty per cent in 1847, and elsewhere in the west, south, and south-east the cultivated area also declined. Finisterre was the only *département* in France in which the area under potatoes exceeded that under either wheat or barley in 1845. Even given the considerable increase in the area under buckwheat,

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one might expect the failure of the potato to have caused some problems there. Yet there is little sign of this in Maps I or II. On the other hand, in several *départements*, particularly in the north and east, there was an increase in the area under potatoes between 1846 and 1847. Such shifts were dwarfed by what was happening in Ireland and in the Low Countries.

<sup>17</sup> These generalisations are based on official data (for France, and for Ireland in 1847) and on the estimates of Austin Bourke (1993: ch. 7).

<sup>18</sup> The underlying French data are in Archives Nationales, 'Mercuriales de la France', Série F11. The Irish data come from Ó Gráda 2004.

<sup>19</sup> See too Mokyr 1979; Solar 1995; Neal 1997; Ó Gráda 1999.